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> [Nano Lett.](#) 2012 Jul 11;12(7):3356-62. doi: 10.1021/nl203107k. Epub 2012 Jun 15.

## Graphene oxide and lipid membranes: interactions and nanocomposite structures

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### Abstract

We have investigated the interaction between graphene oxide and lipid membranes, using both supported lipid membranes and supported liposomes. Also, the reverse situation, where a surface coated with graphene oxide was exposed to liposomes in solution, was studied. We discovered graphene oxide-induced rupture of preadsorbed liposomes and the formation of a nanocomposite, bio-nonbio multilayer structure, consisting of alternating graphene oxide monolayers and lipid membranes. The assembly process was monitored in real time by two complementary surface analytical techniques (the quartz crystal microbalance with dissipation monitoring technique (QCM-D) and dual polarization interferometry (DPI)), and the formed structures were imaged with atomic force microscopy (AFM). From a basic science point of view, the results point toward the importance of electrostatic interactions between graphene oxide and lipid headgroups. Implications from a more practical point of view concern structure-activity relationship for biological health/safety aspects of graphene oxide and the potential of the nanocomposite, multilayer structure as scaffolds for advanced biomolecular functions and sensing applications.

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